



CRYOCOOL Systems Product Manual

This manual covers the following units

Air cooled under counter units

CRYO 10 AU

CRYO 20 AU

CRYO 30 AU

CRYO 40 AU

Air cooled floor standing units

CRYO 40 AF

CRYO 50 AF

CRYO 60 AF

CRYO 70 AF

CRYO 90 AF

CRYO 100 AF

Water cooled floor standing units

CRYO 80 WF

CRYO 100 WF



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The System

Product overview

A range of draught beer dispense glycol cooling systems delivering consistently cold temperatures (between 2°C and 4°C) from a minimum of one dispense point in the CRYO 10 AU to a maximum of 14 dispense points in the CRYO 90 AF/100 WF. The system utilises a CRYO system cooler containing a sub zero coolant. Product is cooled in coils which are immersed in the sub zero coolant. The cooled product temperature is maintained by using a super chill python installed between the CRYO system cooler and the dispense point. A 'clean mode' allows cleaning solution and water to be drawn through the product coils without freezing.

Configuration

Product stored at a maximum of 13°C in a temperature controlled cellar is supplied to the product coils in the CRYO cooler by a standard dispense panel.

A super chill python, made using 3/8" product lines, 2 x recirculation lines and insulated, is connected to the product coil outlets and recirculation pump flow and return. When using a 14 line super chill python connect only the 12 lines which are wrapped within the 19mm insulation, the other 2 are built in for redundancy purposes and should not be used, drinks will be out of specification if they are.

The glycol mix in the CRYO cooler's coolant bath is pumped around the super chill python to maintain the temperature of the product between the CRYO cooler and the point of dispense.

Trace cooling is recommended to maintain the casual drink temperature within specification.

Handling and Transportation

- Keep the CRYO coolers in an upright position during transportation.
- Do not drag the CRYO coolers over rough floors or down steps.
- Keep the CRYO coolers in an upright position and do not move when the coolant bath is full.
- Upon receipt ensure no damage to the CRYO cooler, if damaged contact Cornelius immediately.

Location

Under counter CRYO AU coolers

The CRYO AU coolers may be sited under the bar, close to the point of dispense, in an ambient air temperature not exceeding 40°C. Allow 80mm clearance around the unit to aid air circulation and keep the front of the unit clear to allow an unimpeded fresh air supply to enter the cooler. The CRYO AU coolers should not be exposed to liquid spillage, spray, steam or high humidity.

A suitable position should be chosen within 2 metres of an earthed, switched 13A socket, leaving enough space around the CRYO AU cooler for the unit's correct operation/servicing requirements. Site CRYO coolers on a firm, level support. Locate the CRYO AU coolers as to protect from physical damage and do not place any other items on top of the unit.

Floor mounted CRYO AF coolers

The CRYO AF coolers may be sited within store rooms or other appropriate internal areas where the ambient air temperature will not exceed 40°C. The CRYO AF should not be exposed to liquid spillage, spray, steam or high humidity.

A suitable position should be chosen within 2 metres of a 13A socket, leaving enough space around the CRYO AF cooler for the unit's correct operation/servicing requirements. Site CRYO coolers on a firm, level support. Locate the CRYO AF cooler as to protect from physical damage and do not place any other items on top of the unit.



Location continued

Floor mounted CRYO WF coolers

The CRYO WF coolers may be sited within cooled cellars, store rooms or other appropriate internal areas where the ambient air temperature will not exceed 40°C, however when used in the CRYOCOOL system it is better to site the CRYO WF coolers in the temperature controlled product store. The CRYO WF coolers should not be exposed to liquid spillage, spray, steam or high humidity.

A suitable position should be chosen within 2 metres of a 13A socket, leaving enough space around the CRYO WF coolers for the unit's correct operation/servicing requirements. Site CRYO coolers on a firm level support. Locate the CRYO WF coolers as to protect from physical damage and do not place any other items on top of the unit.

The CRYO WF coolers use conventional remote discharge coolers to remove waste heat from the refrigeration unit. The discharge coolers can be sited up to 50 metres from the CRYO WF coolers (follow instruction guidance from the discharge cooler) The electrical connections between CRYO WF coolers and discharge coolers must be made with suitable 1.5mm² cable, and the coolant lines using 15mm O.D tubing, with a sufficient bore to ensure a minimum flow in this circuit of 4.5litres/minute.

Installation

CRYO AU coolers

Warning, this appliance must be earthed!

Caution, avoid spilling the glycol mix, wipe excess glycol away as it is slippery!

Installation must only be carried out by a suitably trained person and comply with national and local codes for connection to the electrical supply. It is recommended that the mains electrical supply is protected by an RCCB.

Locate the CRYO AU cooler in a selected position within 3 metres, including 1 metre lift, of the dispense point (for a CRYO AU cooler fitted with a Number 2 pump) and 8 metres, including 1 metre lift, (for a CRYO AU cooler fitted with a Number 6 pump). The 13A 230V socket should be within 2 metres of the CRYO AU cooler and should be easily accessible for isolation. The socket should be installed in accordance with current I.E.E regulations.

Fill the coolant bath with glycol and water (mixed at 30% glycol, 70% water). The coolant bath should be filled with this glycol mix until the mixture flows out of the overflow. Fit the overflow cap when the mixture has stopped dripping from the overflow.

CRYO AF coolers

Warning, this appliance must be earthed!

Caution, avoid spilling the glycol mix, wipe excess glycol away as it is slippery!

Installation must only be carried out by a suitably trained person and comply with national and local codes for connection to the electrical supply. It is recommended that the mains electrical supply is 13A 230V protected by an RCCB. The socket should be no further away than 2 metres of the CRYO AF cooler, be easily accessible for isolation and be installed in accordance with current I.E.E regulations.

Locate the CRYO AF cooler in a selected position on a firm level support, within 30 metres of the dispense point (for CRYO AF 40, 50 & 60 coolers fitted with a 3 stage pump) or 40 metres (for CRYO AF 70 & 90 coolers fitted with a 4 stage pump). Avoid warm areas (i.e. cupboards or small storerooms).

Fill the coolant bath with glycol and water (mixed at 30% glycol, 70% water). The coolant bath should be filled with this glycol mix until the mixture flows out of the overflow.



CRYO WF and Discharge Cooler

Warning, this appliance must be earthed!

Caution, avoid spilling the glycol mix, wipe excess glycol away as it is slippery!

Installation must only be carried out by a suitably trained person and comply with national and local codes for connection to electrical supply. It is recommended that the mains electrical supply is protected by an RCCB. Locate CRYO WF coolers in selected position on a firm level support, within 2 metres of a 13A, 230 volt socket which should be easily accessible for isolation of the CRYO WF coolers. The socket should be installed in accordance with current I.E.E regulations.

Locate the CRYO WF cooler in a selected position on a firm level support, within 40 metres of the dispense point (for CRYO WF 80 & 100 coolers fitted with a 4 stage pump)

Fill the coolant bath with glycol and water (mixed at 30% glycol, 70% water). The coolant bath should be filled with this glycol mix until the mixture flows out of the overflow. See below **Glycol Lines/Wiring**

The discharge cooler should be mounted on an exterior wall, not south facing, and provide access for pipes and electrical cable to the base unit (maximum 50m). If no exterior wall is available then mount inside on a wall in a cool room with plenty of fresh air ventilation. Avoid warm areas (i.e. cupboards or small storerooms). Secure the discharge cooler to the chosen location and fix (follow instruction guidance from the discharge cooler) The CRYO WF coolers can be run with the units switched to 'clean' mode (cools to approximately 2°C) and the top mounted pump disconnected, to ensure the integrity of the discharge cooler circuit.

N.B. The fan in the discharge cooler is controlled by a thermal switch mounted in the base of the CRYO 80 & 100 WF. It may switch the fan off when air into the discharge unit drops below approximately 12°C or when the glycol temperature falls below 38°C.

CRYO AU, AF & WF coolers product line connections

All tubing/pythons must be routed to prevent undue stress, tight bends or kinking.

From the sub zero python connect the recirculation lines to the flow and return of the top mounted recirculation pump on the CRYO coolers. From the dispense panel in the temperature controlled cellar connect the product lines to the inlet of the product coils of the CRYO coolers. Connect product lines of the super chill python to the outlet of the product coils of the CRYO coolers. Note: All lines to be well insulated to the requirements of the system.

Bypass Valve (Required for CRYO AF & WF coolers only)

At a convenient point immediately after the furthest dispense tower from the cooler, the pre-insulated bypass valve needs to be fitted to ensure suitable differential pressure is maintained between the flow and return lines. Connect the valve between the flow and return lines, ensuring the arrow on the valve is pointing in the direction of the return manifold. Connections between python insulation and the valve can be sealed using PVC tape and/or Armaflex tape.

See installation checklist below

Trace Cooling

To allow trace cooling, a 'T' piece is fitted in the recirculation flow line allowing the glycol to circulate around the trace cooling loop and return into another 'T' piece fitted in the recirculation return line. To encourage flow through the trace cooling loop a pressure bypass valve is fitted between the flow and return at the end of the super chill python (AF & WF coolers only); this creates a pressure difference of approximately 10psi between the recirculation flow and return. The trace cooling flow rate is adjusted using a flow regulator located in the return trace cooling line before it re-enters the 'T' piece in the return python line. A nominal flow rate of 1 litre/minute (adjusted when commissioning) ensures adequate cooling under most conditions.

Note: Where capillary tube is less than 0.75m long and where the 9.5mm beer line is terminated close to the python exit point, trace cooling may be omitted. For all other instances trace cooling will be required.



Glycol Lines/Wiring (CRYO WF units only)

Using a minimum 1.5mm² two core cable for a maximum 50m run, connect the Discharge Cooler to the CRYO WF cooler. Connect the two core cable to the bottom two pins on the plug. The plug socket is located at the rear of the CRYO WF cooler (Note: This is a nominal 24 volt supply).

Complete the glycol circuit by connecting the pipe work between the CRYO WF cooler and the discharge cooler with the aid of the fittings provided. Avoid ups and downs in each glycol line as this may create air locks. Do not kink or crush the tubing, ensure minimum bend radii of 100mm and support where necessary.

THE LINES SHOULD NEVER BE TAPED TOGETHER OR INSULATED!

As the glycol lines will carry a hot glycol mix under pressure it is important for safety reasons that suitable tubing is used. Consult a specialist tubing manufacturer or contact Cornelius in case of difficulty. **PVC tubing, whether braided or not, is not suitable for this application.**

The tubing ID must be sufficient to ensure a minimum flow rate of 4.5 litres/minute in the glycol circuit. For a run of 50m an ID of at least 11.5mm will be required. Avoid using elbow joints as these cause pressure drops.

Glycol Mix

Mix monopropylene glycol and water to give a solution of 30% glycol 70% water.

Do not use ethylene glycol. Glycol should be mixed in a clean container.

Ensure sufficient glycol/water mixture is available for pouring into both tanks before switching the CRYO WF coolers on. You will need to prepare:

24 litres of glycol then top up, to just above the evaporator, with water (Coolant bath)

9 litres of glycol/water mix (coolant tank)

As the glycol/water mix drops keep filling the bath/tank. Do not allow the pumps to run dry!

The system will require topping up with glycol/water mix at the following ratio's:

2.1 litres for every 10m of 11.5mm ID tubing

4.2 litres for every 20m of 11.5mm ID tubing

6.3 litres for every 30m of 11.5mm ID tubing

8.4 litres for every 40m of 11.5mm ID tubing

10.5 litres for every 50m of 11.5mm ID tubing

Refer to pages 18, 19 and 20 for glycol graphs and refractometer use.



CRYOCOOL Installation Check list

These sheets are intended as a guide to a method of installation of the CRYOCOOL System.

Cellar Installation (CRYO AF & WF)

1	Site Cooler(s) (CRYO AF & WF)	
2	Install heat dumps in position (CRYO WF coolers only)	
3	Run pipe work and cable to heat dumps (CRYO WF coolers only)	
4	Fill CRYO Cooler with glycol to correct strength (CRYO WF coolers only)	
5	Fill coil in bottle with glycol (CRYO WF coolers only)	
6	Connect cooler to power supply with Glycol Recirculation pump unplugged and unit in CLEAN MODE (CRYO WF coolers only)	
7	With the CRYO cooler in clean mode switch on and check for leaks	
8	Install product lines from dispense panel to cooler	
9	Install python between cooler position and bar, leaving enough length to Top and Tail	
10	Connect recirculation tubes to cooler	
11	Connect product lines to cooler ensuring all exposed tubing is insulated 3/8 fittings (not supplied)	



Bar Installation

1	Site coolers (CRYO AU only)
2	Run python into position in bar
3	Pull out product lines from python close to and beneath relevant font re-taping as you go
4	Fit flow control to product lines (not supplied) keeping 3/8 pipe to minimum between flow control and python
5	Connect restrictor tube between flow controls and taps. Tape and insulate
6	Fit trace cooling tees into python as required and insulate
7	Fit Pressure Balancing valve between flow and return. (Arrow in direction of Flow) Tape and insulate (CRYO AF & WF coolers only)
8	Switch unit on in clean mode and check for leaks (CRYO AU coolers only)
9	Plug in Glycol Recirculation pump and check for leaks (CRYO AF & WF)
10	Top cooler tank up with Glycol
11	Draw water through product lines to check for leaks
12	Ensure all connections are taped and insulated
13	Check flow rate with water as per product specification
14	Sanitise Lines
15	Draw beer through each line to font. Adjust flow rate if required
16	Ensure all water has been purged from system before switching the Cooler to 'run' mode
17	Commission system



Commissioning

The CRYO coolers will cool glycol to a sub zero temperature- DO NOT TOUCH.

Before switching the CRYO AU, AF & WF to 'cool' mode ensure that all coils are purged with product!

Commissioning can only be successfully completed when:

- Recirculation pump is running and all components are installed and connected
- Glycol bath temperature remains between set range of temperatures.

Ensure products dispensed at between 2°C and 4°C.

Note: The temperature controller on the CRYO coolers do not require any alteration during set up, they are factory set to the parameters required.

Trace cooling (if applicable)

Begin with setting the trace cooling flow on each trace cooling loop. Turn the knurled knob on the flow adjustment valve 1.5 turns anticlockwise, from fully closed. This will give approximately 1 litre/minute, which is sufficient for maintaining cooled product in the lines.

Product Supply

Cleaning lines

All product lines should be sterilised using known procedures and cleaning chemicals. It is absolutely essential that all traces of water are removed from extra-cold product lines before commissioning begins. Failure to do this will result in frozen coils, and damage to the system may result. Suggest, ensuring the CRYO coolers are at the correct temperature to perform the cleaning operation switch to "clean" at the end of the evening and perform the cleaning operation the next day.

Cleaning socket labels

Cleaning reminder labels (supplied) should be installed adjacent to the extra-cold cleaning sockets in the cellar. In accounts where it is felt that the cleaning regime may be overlooked, additional labels (not supplied) can be fitted to the keg connectors.



Maintenance (Faults/Repairs)

- There are no user serviceable items inside the equipment.
- Maintenance must only be carried out by a properly qualified and trained person.
- Switch off the mains supply and unplug the equipment if it malfunctions or receives any physical damage causing it to become unsafe and/or working outside the parameters set in this document.

User Maintenance

- Switch off and unplug the unit during maintenance operations. Do not remove any protective covers.
- Ensure grills and condenser fins remain unobstructed and free from dust/fluff etc. at all times to ensure reliable and consistent performance. A soft brush or vacuum cleaner may be used for cleaning.
- Ensure that objects are not placed on top the unit as this may affect its function.
- Product coils/lines should be cleaned by flushing with water followed by a chlorinated alkaline sanitising agent and final potable water flush when tainting is evident or when advised by the equipment installer or beverage supplier. It is important that the sanitising agent manufacturer's procedure and safety precautions are followed when using caustic chemicals.
- The 1989 Electricity at Work Regulations require periodic testing of electrical equipment and this should only be carried out by a competent person.

Compliance To Standards And Legislation

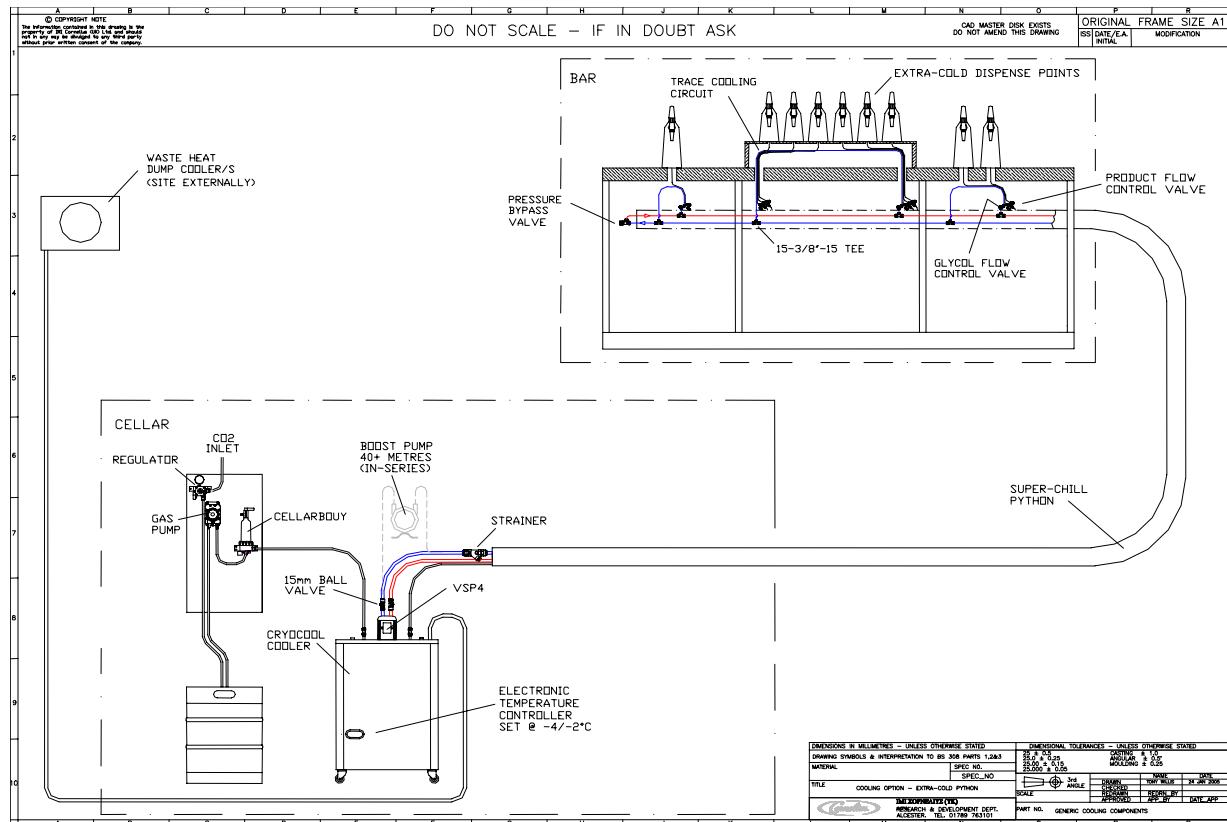
All coolers comply with Brewers Society Code of Practice for Electrical Safety in Beer Dispense in License Premises. Designed to EN60335-1,2-24 (Safety of Household and Similar Electrical Appliances-General Requirements) Product coils are made from 316 stainless steel. Product complies with the EMC Directive 89/336//EEC as amended by 92/31/EEC and Low Voltage Directive 73/23/EEC as amended by 93/68/EEC.





System Schematic

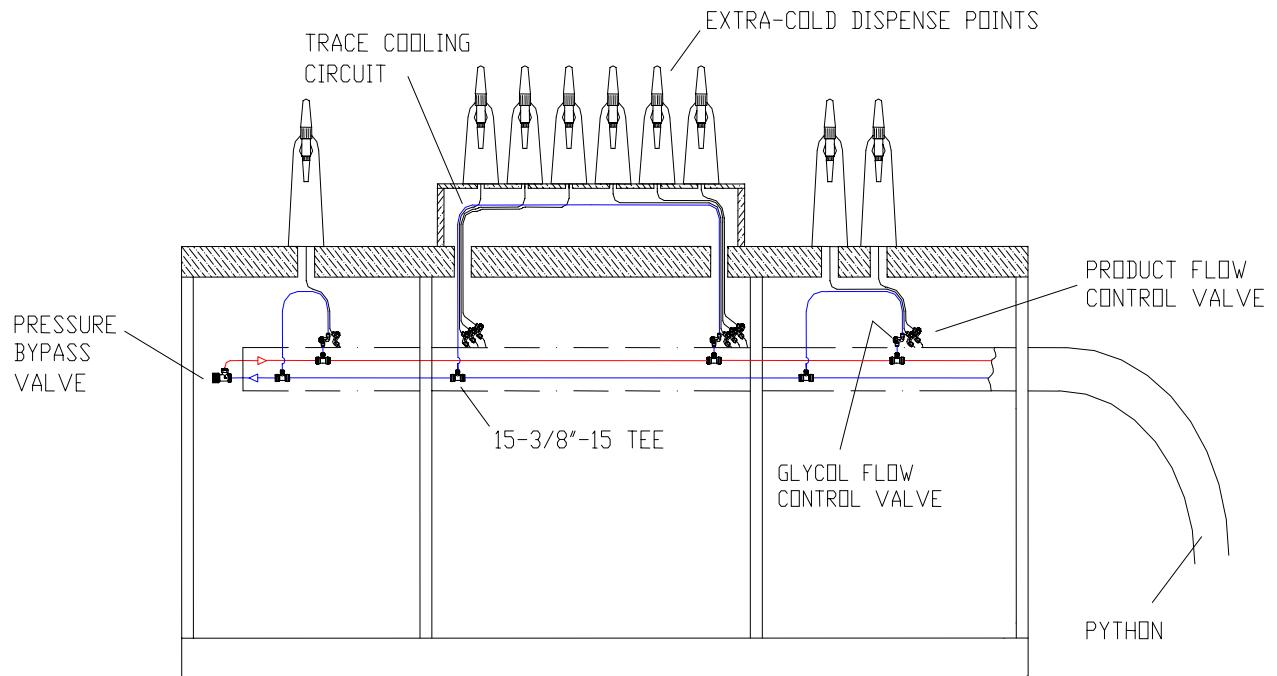
Bar and Cellar area CRYO AU/AF/WF





System Schematic

Bar area CRYO AU/AF/WF



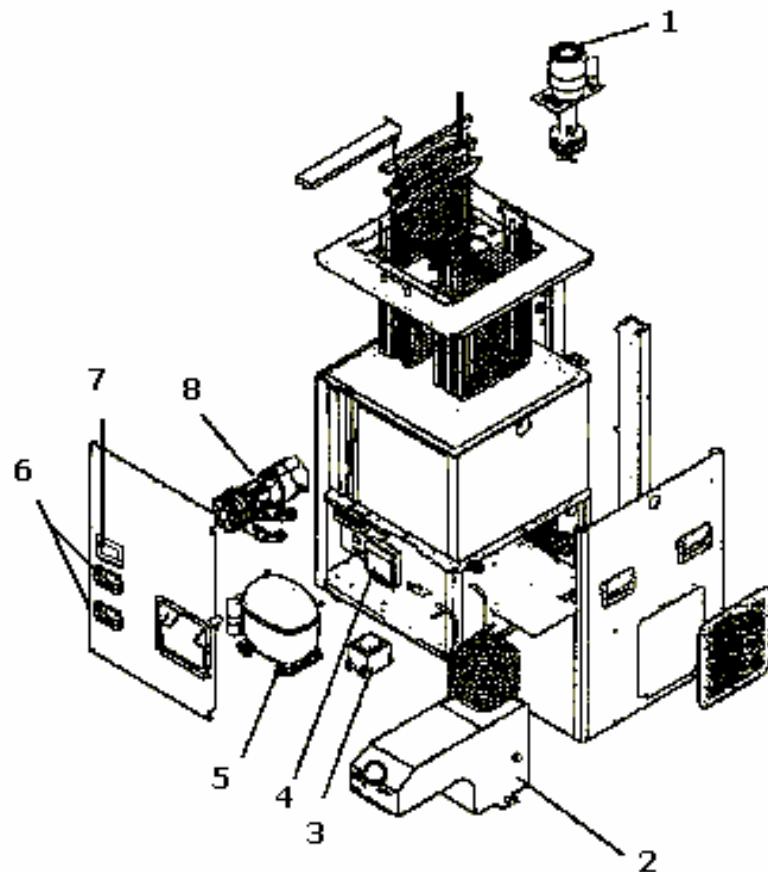
UNDERBAR TRACE COOLING SCHEMATIC

**SPARES LIST****CRYO 80 & 100 WF**

ITEM	PART No.	DESCRIPTION
1	58 0420 591	TOP PUMP 4 STAGE
2	06 0 105103	GLYCOL BOTTLE
	06 0 105104	LID GLYCOL BOTTLE
	2MC824A	GLYCOL PROPYLENE 4 LTR
	15ISV	BALL VALVE 15mm
3	58 0440 429	TRANSFORMER BASLER BE30691-002
4	58 0400 098	TEMPERATURE CONTROL PRE 14/04/05
4	58 0400 135	TEMPERATURE CONTROL POST 14/04/05
	58 0400 091	FAN SWITCH T/STAT K55 RANCO(bronze phial)
	58 0400 092	THERM CUTOUT STAT K36-PI366000(silver phial)
5	44 0000 256	COMP SET 34cc – CAJ4511Y CRYO 100
	3TS008A	COMPRESSOR START RELAY CRYO 100
	3TS017A	COMPRESSOR START CAPACITOR CRYO 100
	3TS026A	OVERLOAD CRYO 100
	3TS029A	RUN CAPACITOR CRYO 100
	58 0900 086	COMP SET 21cc CRYO 80
	3DF001A	COMPRESSOR START RELAY CRYO 80
	58 0420 143	COMPRESSOR START CAPACITOR CRYO 80
6	06 0 105127	BEZEL LENS (x2)
7	58 0410 216	FAN MTR (COMPRESSOR COOLING) CRYO 100
8	58 0420 610	PUMP GLYCOL
n/s	99 2MR400A	FAN MOTOR - 24v 50Hz (HEAT DUMP)
n/s	58 0450 097	THERMOSTATIC EXPANSION VALVE
n/s	58 0450 098	ORIFICE
n/s	3SW004A	CLEANING SWITCH
n/s	58 0400 075	CLEANING SWITCH THERMOSTAT



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EXPLODED VIEW
CRYO 80 & 100 WF

SYSTEM SPARES
CRYOCOOL

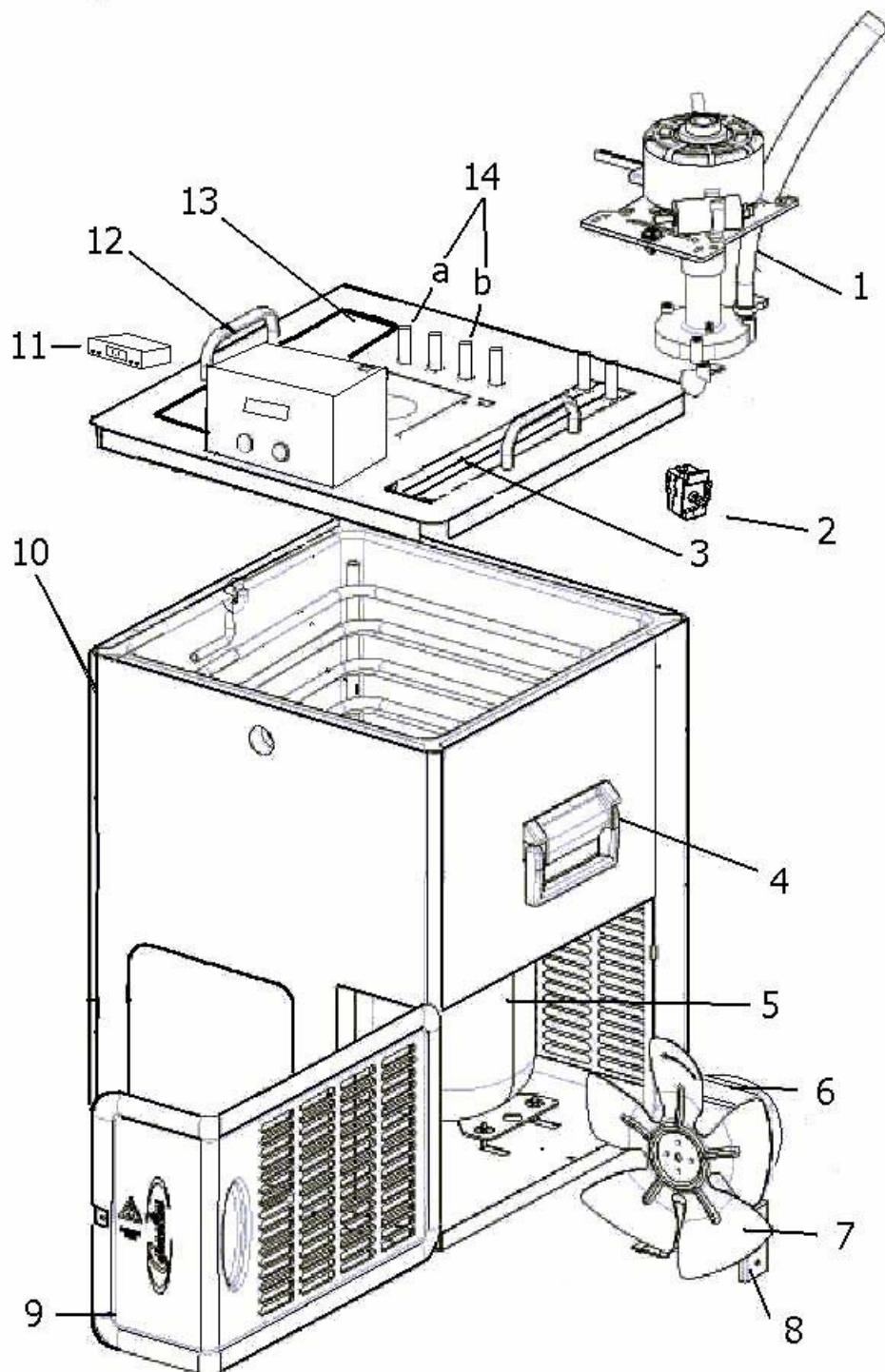
	PART No.	DESCRIPTION
	CZZ 096 122 402	96VA TRANSFORMER
	PART No.	DESCRIPTION
	07 0 001589	INSULATED STRAINER
	PART No.	DESCRIPTION
	07 0 001587	DIFFERENTIAL PRESSURE VALVE
	PART No.	DESCRIPTION
	38 0 27431	FLOW CONTROL VALVE

**SPARES LIST****CRYO 50 & 60 AF**

ITEM	PART No.	DESCRIPTION
1	58 0420 592	No 15 PUMP ASSY CRYO 50
	58 0420 591	4-STAGE PUMP ASSEMBLY CRYO 60
2	58 0400 075	THERMOSTAT WATERBATH
3	06 0 130247	CASSETTE COIL CRYO 50
	06 0 130338	CASSETTE COIL CRYO 60
4	06 0 105113	HANDLE
5	44 0000 207	COMP SET FR11GX HST CRYO 50
	99 0420 090	COMPRESSOR START RELAY CRYO 50
	99 0420 059	COMPRESSOR CAPACITOR CRYO 50
	44 0000 209	COMPRESSOR SET SC18G CRYO 60
6	99 2914 201	FAN MOTOR CRYO 50
	58 0410 203	FAN MOTOR CRYO 60
7	58 0431 015	FAN BLADE CRYO 50
	85 6012 045	FAN BLADE CRYO 60
8	06 0 131111	FAN BRACKET CRYO 50
	06 0 131307	FAN BRACKET CRYO 60
9	06 0 135103	SERVICE PANEL
10	06 0 138205	LOGO CRYO 50
	06 0 138302	LOGO CRYO 60
11	58 0404 001	CONTROLLER CRYO 50
	06 0 130281	CONTROLLER CRYO 60
12	58 0475 214	HANDLE – LID
13	06 0 135203	HATCH – INSPECTION CRYO 50
	06 0 105131	HATCH – INSPECTION CRYO 60

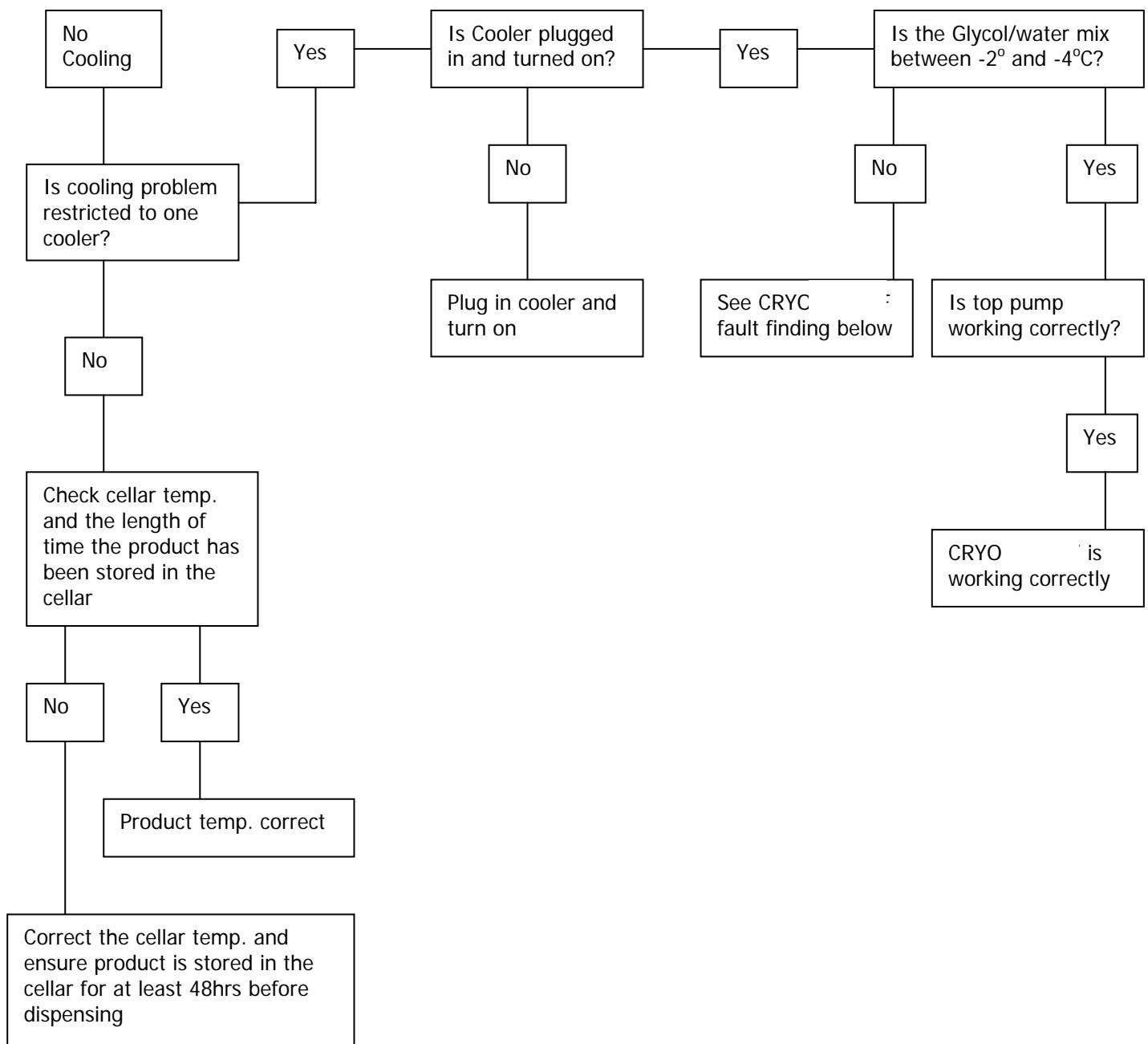


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**EXPLODED VIEW****CRYO 50 AF**

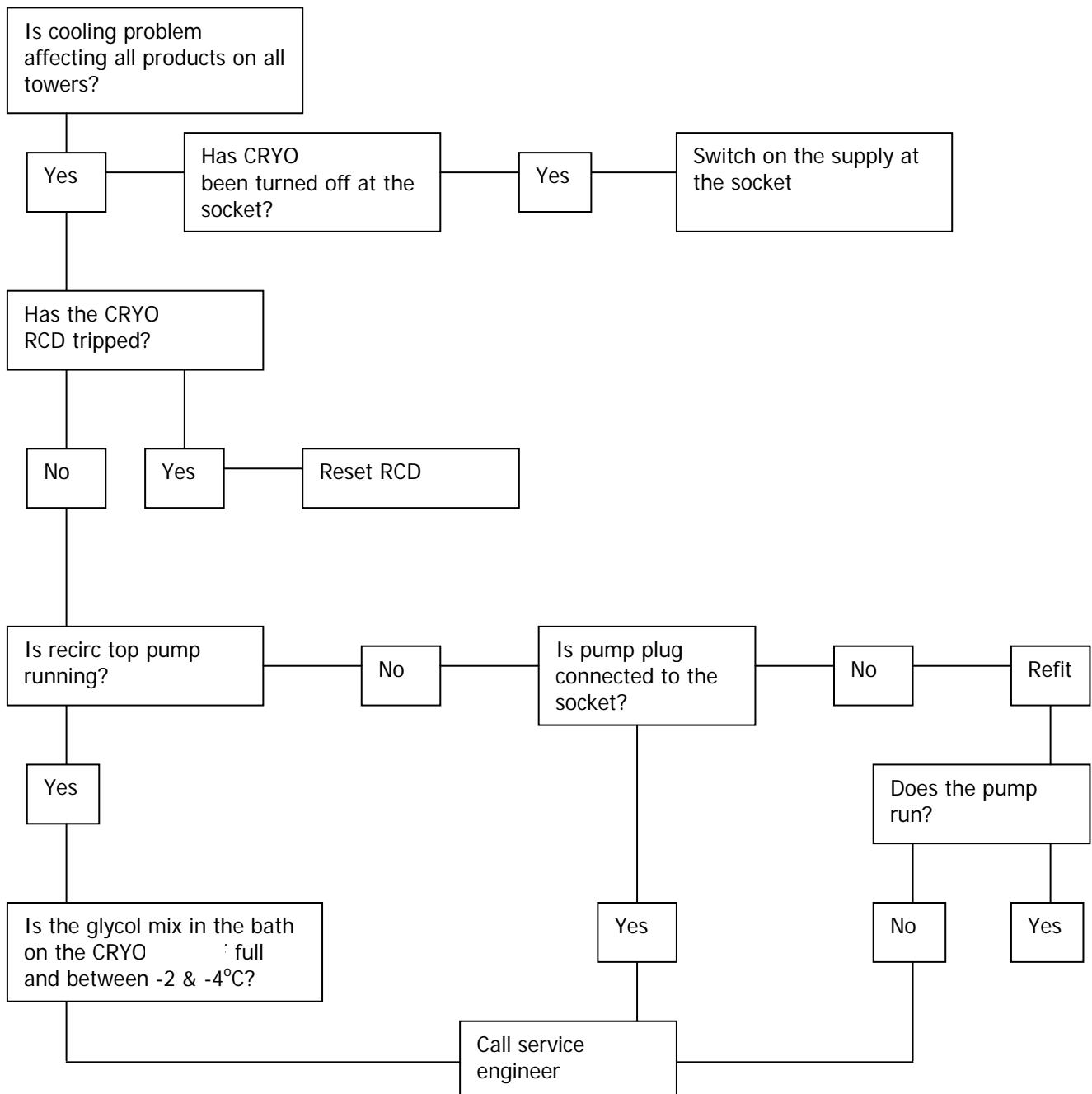


CRYOCOOL SYSTEM



Fault Finding cont..

CRYOCOOL SYSTEM

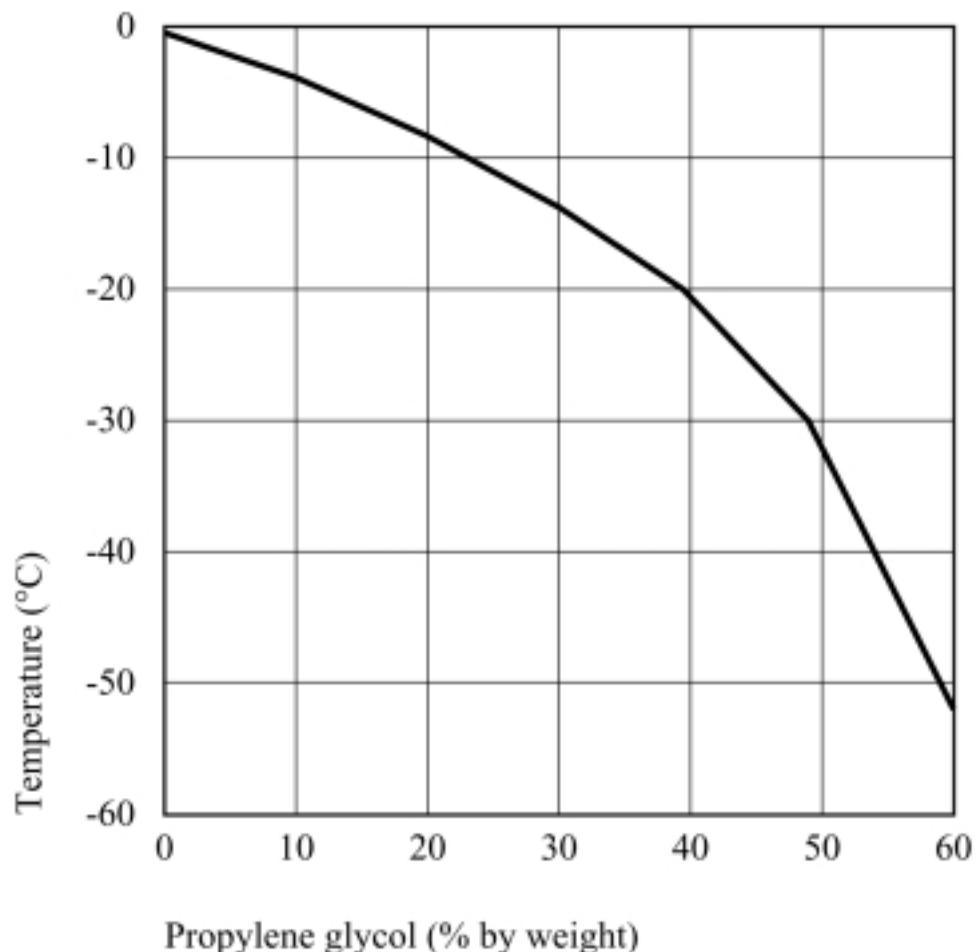


Glycol

Glycol Freezing Points

A 30/70 mix of Glycol/Water has a freezing point at around -14°C (Refer to Graph 1)

Freezing Points of Aqueous Solutions of Propylene Glycol



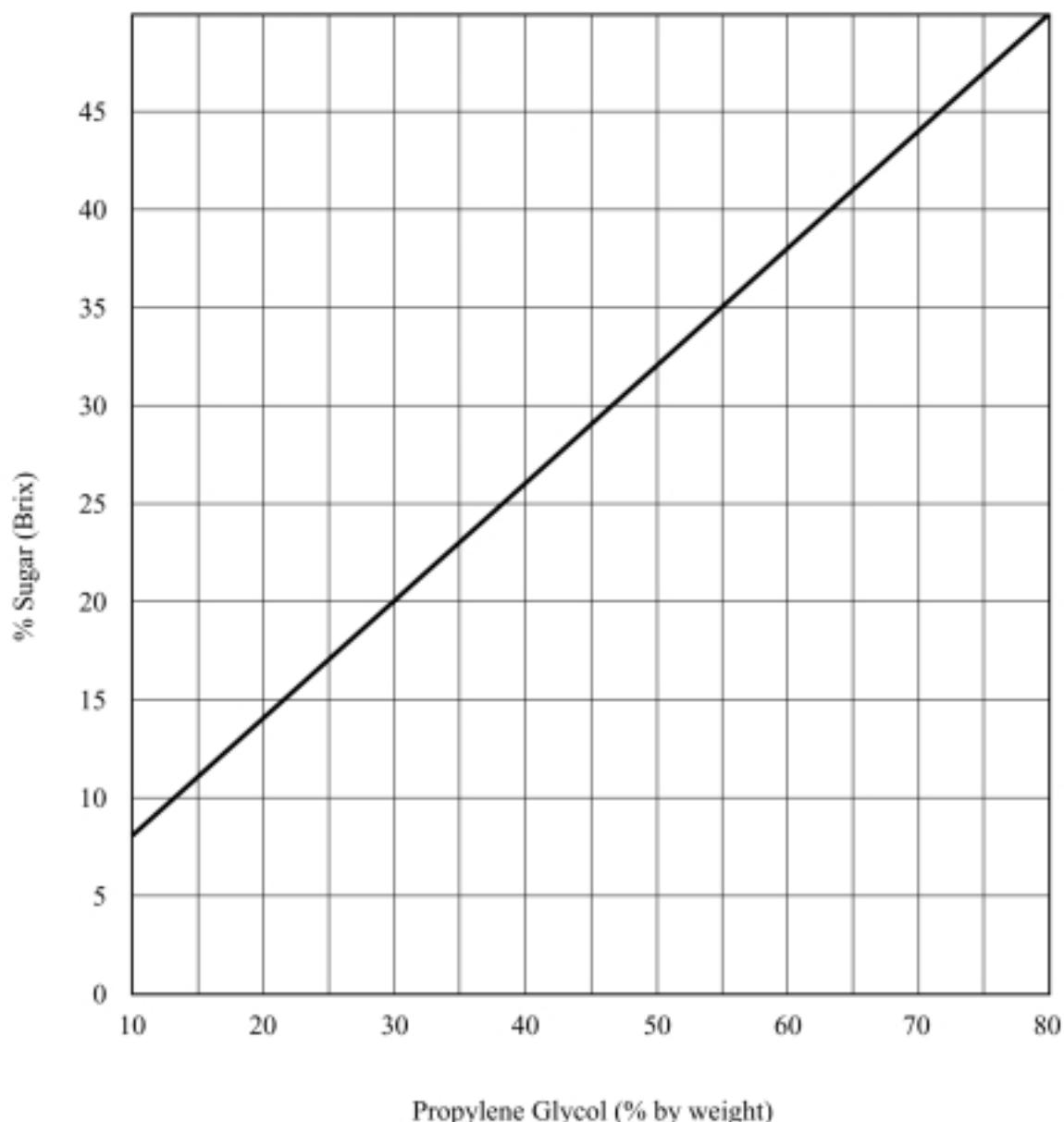
Graph 1.



Glycol Mix Brix

A 30/70 mix of Glycol/Water has a sugar percentage (Brix) of around 20% (Refer to Graph 2)

**% Sugar (Brix) vs Glycol Concentration
at Constant Temperature**



Graph 2.

Refractometer Usage

Instructions for the use of the hand refractometer for measuring Glycol/Water Concentrations

Calibration

- Flip open the daylight plate, which covers the prism.
- Apply one or two drops of clean tap water onto the prism, using a soft applicator, such as a cable tie.
- Close the daylight plate.
- Holding the refractometer up to the light, look at the scale through the eyepiece, turning the eyepiece assembly until the boundary line, created by the water, is in sharp focus.
- Using the small adjuster screw just in front of the daylight plate, adjust the boundary line until it reads zero.
- Wipe the prism and daylight plate clean and dry, using tissue paper.

The refractometer is now calibrated for use.

Measuring the glycol concentration

- Apply one or two drops of the sample solution onto the prism, using a soft applicator.
- Close the daylight plate.
- Hold the refractometer up to the light, and look at the scale through the eyepiece, turning the eyepiece assembly until the boundary line comes into focus.
- Read the scale, where the boundary line intercepts it; If the reading is $20\% \pm 2\%$, the solution is correct.
- Below 18%, the solution is too weak, and requires the addition of more neat glycol.
- Above 22%, the solution is too strong, and requires the addition of more water.

Note: The correct ratio of glycol to water is 30% glycol to 70% water. (1: 2 1/3) The refractometer is a delicate instrument, and care should be taken when handling it; NEVER apply liquid to the prism with anything other than a soft applicator, and always clean and dry, after use, with water and tissue paper.

